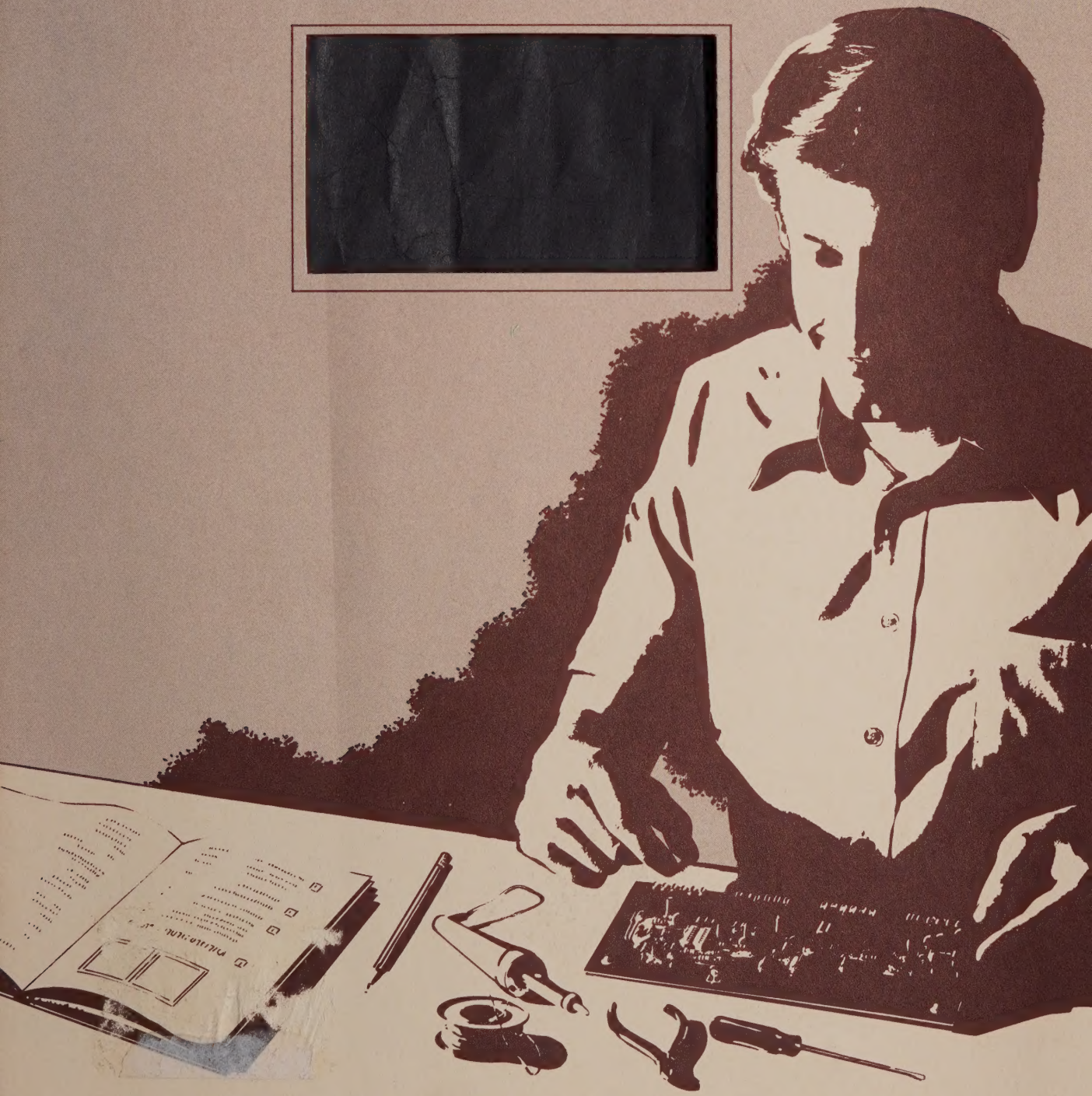
HEATHKIT® MANUAL



HEATH COMPANY • BENTON HARBOR, MICHIGAN

HEATH COMPANY PHONE DIRECTORY

The following telephone numbers are direct lines to the departments listed:

Kit orders and delivery information ..... (616) 982-3411
Credit ..... (616) 982-3561
Replacement Parts ..... (616) 982-3571
Technical Assistance:
R/C, Audio, and Electronic Organs ..... (616) 982-3310
Amateur Radio ..... (616) 982-3296
Test Equipment, Strobe Lights, Calculators, Clocks, Weather Instruments ..... (616) 982-3315
Television ..... (616) 982-3307
Automotive, Marine, Appliances, Security, General Products ..... (616) 982-3496

YOUR HEATHKIT 90-DAY FULL WARRANTY

During your first ninety (90) days of ownership, Heath Company will replace or repair free of charge — as soon as practical — any parts which are defective, either in materials or workmanship. You can obtain parts directly from Heath Company by writing us or telephoning us at (616) 982-3571. And we'll pay shipping charges to get those parts to you — anywhere in the world.

We warrant that, during the first ninety (90) days of ownership, our products, when correctly assembled, calibrated, adjusted, and used in accordance with our printed instructions, will meet published specifications.

If a defective part or error in design has caused your Heathkit product to malfunction during the warranty period, through no fault of yours, we will service it free upon delivery at your expense to the Heath factory, Benton Harbor, Michigan, or to any Heathkit Electronic Center (units of Schlumberger Products Corporation), or through any of our authorized overseas distributors.

You will receive free consultation on any problem you might encounter in the assembly or use of your Heathkit product. Just drop us a line or give us a call. Sorry, we cannot accept collect calls.

Our warranty, both expressed and implied, does not cover damage caused by use of corrosive solder, defective tools, incorrect assembly, misuse, fire, customer-made modifications, flood or acts of God, nor does it include reimbursement for customer assembly or setup time. The warranty covers only Heath products and is not extended to non-Heath allied equipment or components used in conjunction with our products or uses of our products for purposes other than as advertised.

And if you are dissatisfied with our service — warranty or otherwise — or our products, write directly to our Director of Customer Services, Heath Company, Benton Harbor, Michigan, 49022. He'll make certain your problems receive immediate, personal attention.

HEATH COMPANY
BENTON HARBOR, MI. 49022

Prices and specifications subject to change without notice.

Heathkit® Manual

for the

POWER MEGAPHONE

Model GD-1818

595-1902

HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

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PARTS LIST

Check each part against the following list. Any part that is packed in an individual envelope with the part number on it should be placed back in the envelope after you identify it until it is called for in a step. Do not discard any packing materials until all parts are accounted for. The key numbers correspond the the numbers on the Parts Pictorial in the separate Illustration Booklet.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit. If one is not available, refer to "Replacement Parts" inside the rear cover of this Manual. Your Warranty is located inside the front cover of your Manual. For pricing information, refer to the separate "Heath Parts Price List."

Each circuit part in this kit has its own "Circuit component Number" (R1, R2, etc.). This is a specific number for only that one part. The purpose of these numbers is to help you easily identify the same part in each section of the Manual. These numbers will appear:

— In the Parts List;

— At the beginning of each step where a component is installed;

— On the Schematic;

— In the sections at the rear of the Manual.

NOTE: Your Power Megaphone will require eight 1.5-volt "C" size cells (NEDA #14). You should purchase the batteries at this time. There is a cost advantage if you buy heavy-duty alkaline cells for heavy-duty use. However for typical use, the standard carbon-zinc cells listed below, by manufacturer and number, work well.

Burgess #130

Eveready #1035

Mallory #M-14R

Ray-O-Vac #14

RESISTORS

1/2-Watt, 10% (fourth band silver)

The resistors may be packed in more than one envelope. Open all the resistor envelopes in this pack before you check them against the Parts List.

KEY No.	PART No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
A1	1-45	3	220 Ω (red-red-brown)	R18, R28, R29
A1	1-9	5	1000 Ω (brown-black-red)	R9, R22, R23, R25, R26
A1	1-49	1	22 Ω (red-red-black)	R27

1/4-Watt, 10% (fourth band silver)

KEY No.	PART No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
A2	1-9-2	4	10 kΩ (brown-black orange)	R1, R6, R14 R24
A2	1-52-12	1	18 kΩ (brown-gray-orange)	R12
A2	1-46-12	1	27 kΩ (red-violet-orange)	R10
A2	1-47-12	1	150 kΩ (brown-green-yellow)	R13
A2	1-38-12	2	220 kΩ (red-red-yellow)	R4, R19
A2	1-15-12	1	330 kΩ (orange-orange-yellow)	R8

KEY No.	PART No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
1/4-Watt, 10% (fourth band silver, cont'd.)				
A2	1-18-12	4	470 kΩ (yellow-violet-yellow)	R2, R3, R16, R17
A2	1-19-12	2	1 MΩ (brown-black-green)	R11, R15
A2	1-127-12	1	3.3 MΩ (orange-orange-green)	R5
Other				
A3	2-185	2	222 kΩ, 1% precision	R20, R21
A4	3-17-2	1	.75 Ω, 5%, 2-watt (violet-green-silver)	R30
CAPACITORS				
NOTE: Capacitors can be marked in different ways. EXAMPLE: .1, .1k, or .1 μF. However, the Parts List and installation instructions will always use μF.				
Ceramic				
B1	21-23	1	420 pF	C3
B1	21-143	3	.05 μF	C4, C7, C8
Electrolytic				
B2	25-801	2	1.5 μF	C9, C10
B3	25-220	1	10 μF tantalum	C6
B4	25-804	1	100 μF	C2
B5	25-230	1	2000 μF	C11
Mylar*				
B6	27-137	2	.02 μF	C1, C5
DIODES				
C1	56-84	2	1N4148 diode	D3, D4
C1	56-58	1	1N709A zener diode	D1
C1	57-65	1	1N4002 diode	D2

KEY No.	PART No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
TRANSISTORS - INTEGRATED CIRCUIT				
NOTE: Transistors and integrated circuits are marked for identification in one of the following four ways: 1. Part number. 2. Type number. (On integrated circuits this refers only to the numbers; the letters may be different or missing.) 3. Part number and type number. 4. Part number with a type number other than the one listed.				
D1	417-94	2	2N3416 transistor	Q1, Q2
D2	417-162	2	MHT9210 transistor	Q5, Q6
D3	417-864	2	MPS-A05 transistor	Q3, Q4
D4	442-71	1	LM3900 integrated circuit	IC1
HARDWARE				
Assembly Hardware Pack				
NOTE: This entire pack can be ordered as #230-2204. Do not mix this hardware with the other hardware. Hardware is shown actual size.				
E1	230-2215	1	Gasket	
E2	230-2216	1	Trigger	
E3	230-2217	4	4 × 12 mm phillips head screw	
E4	230-2218	2	Mounting plate	
E5	230-2219	2	Heat sink	
E6	230-2220	1	O ring	
E7	230-2221	3	M4 nut	
E8	230-2222	1	Switch with two screws	
E9	230-2223	1	Pilot lamp with nut	
Other Hardware				
F1	250-273	3	4-40 × 3/8″ screw	
F2	250-1218	4	#4 × 7/16″ screw	
F3	252-15	4	4-40 nut	
F4	253-45	3	#8 flat washer	
F5	253-103	2	#3 fiber washer	
F6	254-2	3	#8 lockwasher	
F7	254-9	2	#4 lockwasher	
F8	253-135	1	Rubber washer	

*DuPont Registered Trademark

KEY No.	PART No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.

ASSEMBLIES

G1	230-2200	1	Handle	
G2	230-2201	1	Body, with chassis and two battery sleeves (shown as J7 and J8)	
G3	230-2202	1	Speaker	
G4	230-2203	1	Horn	

MISCELLANEOUS

H1	51-192	1	Audio transformer	T1
	75-711	1	Insulation paper	
	85-1884-1	1	Circuit board	
	344-93	12″	Orange wire	
	344-95	15″	Green wire	
	344-96	8″	Blue wire	
	347-55	9″	8-wire cable	
H2	431-32	1	Terminal strip	
H3	434-267	1	Integrated circuit socket	
H4	490-5	1	Nut starter	
			Solder	

KEY No.	PART No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.

PRINTED MATTER

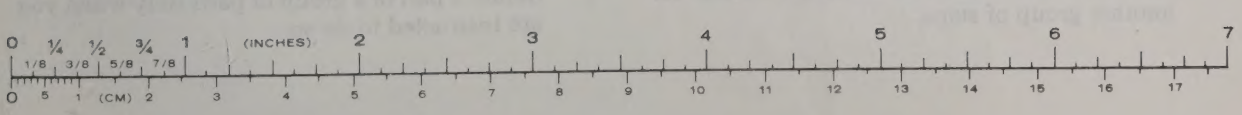
NOTE: Be sure you refer to the numbers on the blue and white label in any communications you may have with Heath Company about this kit. You may want to write in the model and series numbers in the Manual for a future reference.

H5	390-1316	1	Battery label
H6	390-1318	1	Switch label
	390-1319	1	Heath label and Volume label
H7	391-34	1	Blue and white label
		1	Assembly manual (see Page 1 for part number).
	597-260	1	Parts Order Form

Assembly Replacement Parts

Replacement parts are available for some of the parts on the body assembly (#230-2201). These are listed below.

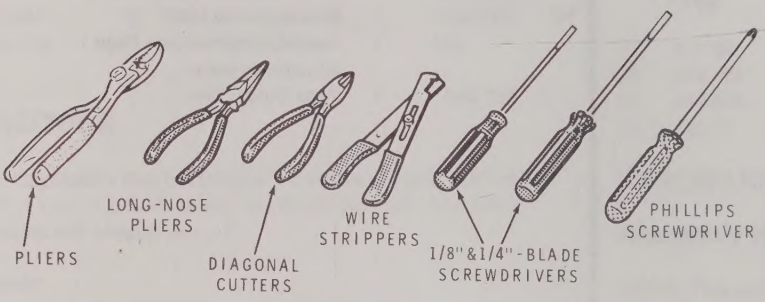
J1	230-2214	1	Control (5kΩ)
J2	230-2210	1	Net (saran protector)
J3	230-2207	1	Microphone
J4	230-2211	1	Microphone cushion
J5	230-2208	1	Battery contact assembly
J6	230-2209	2	4 × 10 mm screw
J7	230-2213	1	Chassis
J8	230-2212	2	Battery sleeve

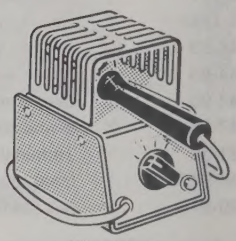


ASSEMBLY NOTES

TOOLS

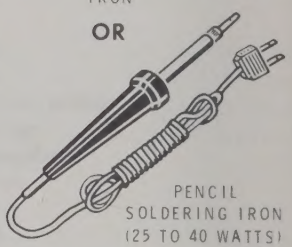
You will need these tools to assemble your kit.





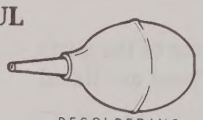
HEATHKIT SOLDERING IRON

OR



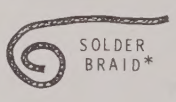
PENCIL SOLDERING IRON (25 TO 40 WATTS)

OTHER HELPFUL TOOLS

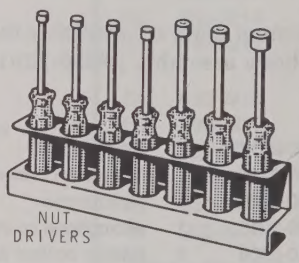


DESOLDERING BULB*

NUT STARTER (MAY BE SUPPLIED WITH KIT)



SOLDER BRAID*



NUT DRIVERS

*TO REMOVE SOLDER FROM CIRCUIT CONNECTIONS.

ASSEMBLY

1. Follow the instructions carefully, and read the entire step before you perform the operation.

2. Position all parts as shown in the Pictorials.

3. The illustrations in the Manual are called Pictorials and Details. Pictorials show the overall operation for a group of assembly steps; Details generally illustrate a single step. When you are directed to refer to a certain Pictorial "for the following steps," continue using that Pictorial until you are referred to another Pictorial for another group of steps.

4. A separate "Illustration Booklet" contains illustrations (Pictorials, Details, etc.) that are too large for the Assembly Manual. When the Manual says to refer to a certain Pictorial or Detail and that illustration is not on the same page, or on the page across from it, refer to the "Illustration Booklet."

   Keep the "Illustration Booklet" with the Assembly Manual. The illustrations in it are arranged in Pictorial number sequence.

5. Solder a part or a group of parts only when you are instructed to do so.

6. Resistors will be called out by their resistance value in Ω (ohms), kΩ (kilohms), or MΩ (megohms), and color code.

7. Capacitors will be called out by their capacitance value (in pF or μF) and type (disc ceramic, Mylar, or electrolytic).

8. When you are instructed to cut something to a particular length, use the scales (rulers) provided at the bottom of the Manual pages.

SAFETY WARNING: Avoid eye injury when you cut off excess lead lengths. Hold the leads so they cannot fly toward your eyes.

SOLDERING

Soldering is one of the most important operations you will perform while assembling your kit. A good solder connection will form an electrical connection between two parts, such as a component lead and a circuit board foil. A bad solder connection could prevent an otherwise well-assembled kit from operating properly.

It is easy to make a good solder connection if you follow a few simple rules:

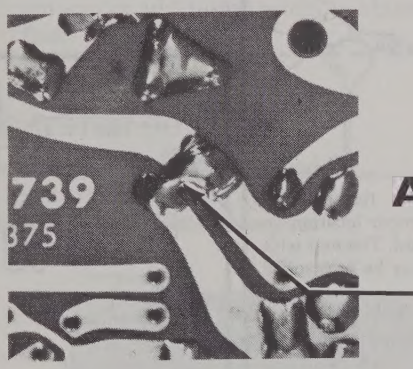
1. Use the right type of soldering iron. A good quality, 25 to 40-watt, pencil soldering iron with a 1/8" or 3/16" chisel or pyramid tip works best.

2. Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to the tip to give the entire tip a wet look. This process is called tinning, and it will protect the tip and enable you to make good connections. When solder tends to "ball" or does not stick to the tip, the tip needs to be cleaned and retinned.

3. Due to the small foil area around the circuit board holes and the small areas between foils, you must use the utmost care to prevent solder bridges between adjacent foil areas.

A solder bridge between two adjacent foils is shown in photograph A below. Photograph B shows how the connection should appear. A solder bridge may occur if you accidentally touch an adjacent previously soldered connection, if you use too much solder, or if you "drag" the soldering iron across other foils as you remove it from the connection. A good rule to follow is: Always take a good look at the foil area around each lead before you solder it. Then, when you solder the connection, make sure the solder remains in this area, and does not bridge to another foil. This is especially important when the foils are small and close together. NOTE: It is alright for solder to bridge two connections on the same foil.

Use only enough solder to make a good connection, and lift the soldering iron straight up from the circuit board. If a solder bridge should develop, turn the circuit board foil-side-down and heat the solder between connections. The excess solder will run onto the tip of the soldering iron, and this will remove the solder bridge. NOTE: The foil side of each circuit board has a coating on it called "solder resist." This is a protective insulation to help prevent solder bridges.



STEP-BY-STEP ASSEMBLY

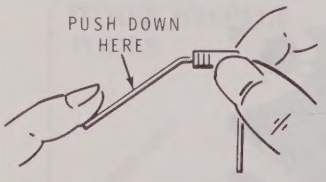
CIRCUIT BOARD

START

In the following steps you will be given detailed instructions on how to install and solder the first part on the circuit board. Read and perform each step carefully. Then use the same procedure whenever you install parts on a circuit board.

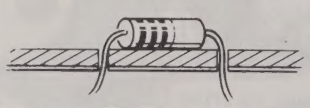
( ) Position the circuit board as shown with the printed side (not the foil side) up.

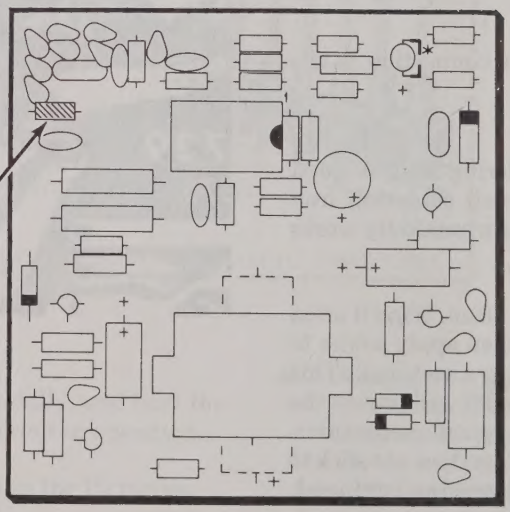
( ) R2: Hold a 470 k Ω (yellow-violet-yellow) resistor by the body as shown and bend the leads straight down.



( ) Push the leads through the holes at the proper location on the circuit board. The end with color bands may be positioned either way.

( ) Press the resistor against the circuit board. Then bend the leads outward slightly to hold the resistor in place.



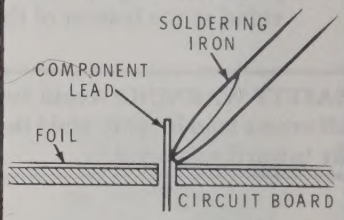


PICTORIAL 1

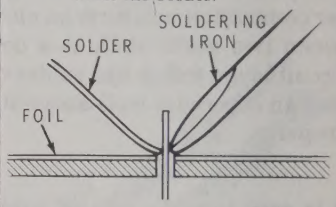
CONTINUE

( ) Solder the resistor leads to the circuit board as follows:

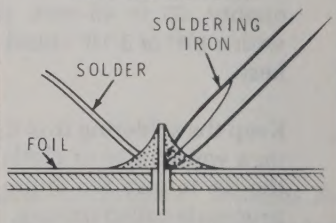
1. Push the soldering iron tip against both the lead and the circuit board foil. Heat both for 2 or 3 seconds.



2. Then apply solder to the other side of the connection. IMPORTANT: Let the heated lead and the circuit board foil melt the solder.



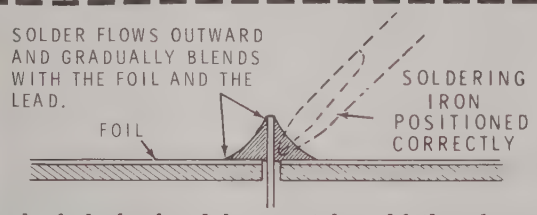
3. As the solder begins to melt, allow it to flow around the connection. Then remove the solder and the iron and let the connection cool.



( ) Hold the lead with one hand while you cut off the excess lead length close to the connection. This will keep you from being hit in the eye by the flying lead.

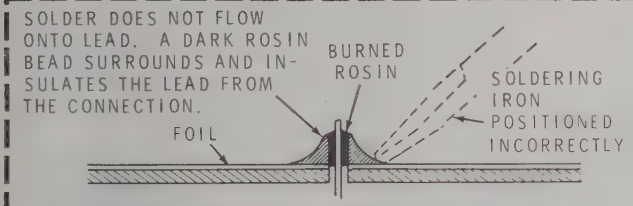
( ) Check the connection. Compare it to the illustrations on the next page. After you have checked the solder connections, proceed with the assembly on Pictorial 2. Use the same soldering procedure for each connection.

A GOOD SOLDER CONNECTION

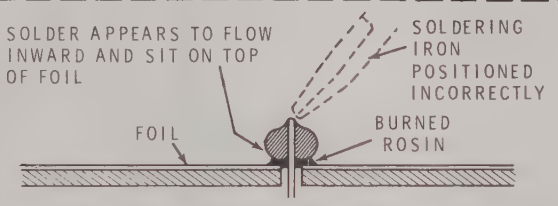


When both the lead and the circuit board foil are heated at the same time, the solder will flow onto the lead and the foil evenly. The solder will make a good electrical connection between the lead and the foil.

POOR SOLDER CONNECTIONS


SOLDER DOES NOT FLOW ONTO LEAD. A DARK ROSIN BEAD SURROUNDS AND INSULATES THE LEAD FROM THE CONNECTION.
BURNED ROSIN
SOLDERING IRON POSITIONED INCORRECTLY
FOIL

When the lead is not heated sufficiently, the solder will not flow onto the lead as shown above. To correct, reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection.



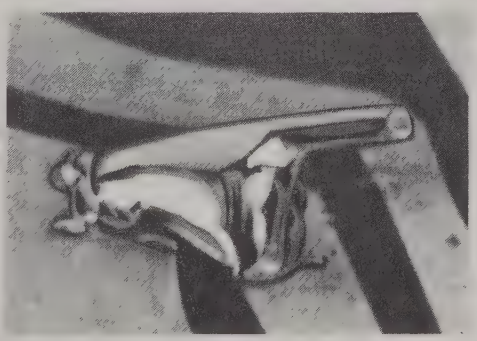
When the foil is not heated sufficiently the solder will blob on the circuit board as shown above. To correct, reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection.

SOLDER CONNECTIONS TO WATCH OUT FOR

The following photographs show examples of the types of bad solder connections that are the most common cause of trouble. If you locate any of these bad solder connections in your kit, correct them as instructed.

Here, hot solder has been dropped onto the foil and the solder connected or bridged (or crossed) three foils. To correct, hold the circuit board above the soldering iron and reheat the solder. As the solder melts, it will flow down the iron.

NOTE: Solder that bridges two connections on the SAME FOIL is alright and should not be corrected.



Here, solder has flowed along a lead and bridged to another foil. To correct, hold the circuit board above the soldering iron and reheat the solder. As the solder melts, it will flow down the iron. Then cut off the excess lead lengths. PROTECT YOUR EYES.

START

NOTE: You will install the 1/4-watt resistors in this Pictorial.

( ) R15: 1 MΩ (brown-black-green).

( ) R10: 27 kΩ (red-violet-orange).

( ) R13: 150 kΩ (brown-green-yellow).

( ) R1: 10 kΩ (brown-black-orange).

( ) R4: 220 kΩ (red-red-yellow).

( ) R3: 470 kΩ (yellow-violet-yellow).

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R17: 470 kΩ (yellow-violet-yellow).

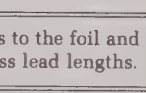
( ) R16: 470 kΩ (yellow-violet-yellow).

( ) R19: 220 kΩ (red-red-yellow).

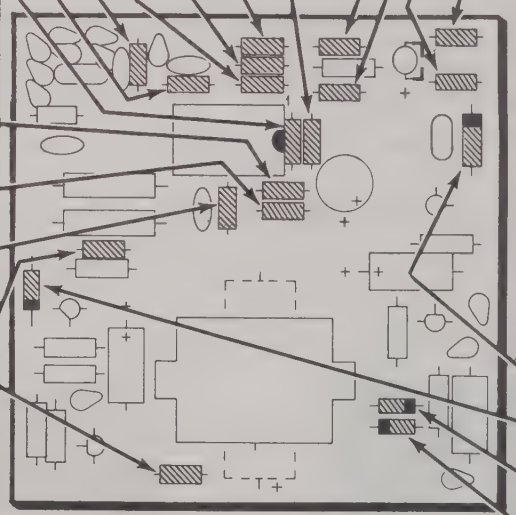
( ) R14: 10 kΩ (brown-black-orange).

( ) R24: 10 kΩ (brown-black-orange).

FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.



( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) R5: 3.3 MΩ (orange-orange-green).

( ) R11: 1 MΩ (brown-black-green).

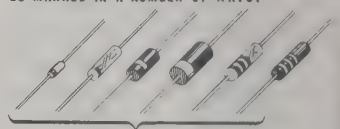
( ) R8: 330 kΩ (orange-orange-yellow).

( ) R6: 10 kΩ (brown-black-orange).

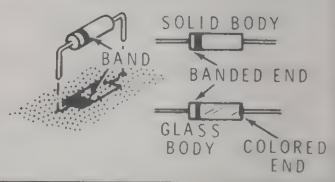
( ) R12: 18 kΩ (brown-gray-orange).

NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board. A DIODE WILL NOT WORK IF IT IS INSTALLED BACKWARDS.

IMPORTANT: THE BANDED END OF DIODES CAN BE MARKED IN A NUMBER OF WAYS.



BANDED END



( ) D1: 1N709A zener diode (#56-58).

( ) D2: 1N4002 diode (#57-65).

( ) D3: 1N4148 diode (#56-84).

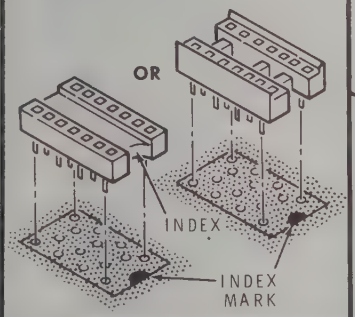
( ) D4: 1N4148 diode (#56-84).

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 2

START

( ) Integrated circuit socket. Insert the socket pins into the holes. The index mark on the circuit board should still be visible after it is installed. Solder the pins to the foil.



( ) R18: 220 Ω (red-red-brown).

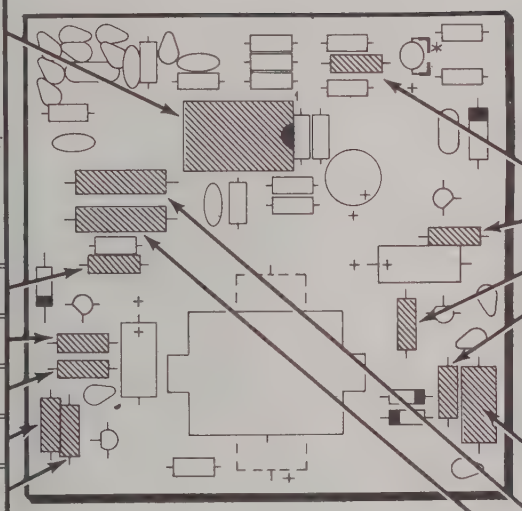
( ) R23: 1000 Ω (brown-black-red).

( ) R29: 220 Ω (red-red-brown).

( ) R27: 22 Ω (red-red-black).

( ) R26: 1000 Ω (brown-black-red).

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) R9: 1000 Ω (brown-black-red).

( ) R22: 1000 Ω (brown-black-red).

( ) R25: 1000 Ω (brown-black-red).

( ) R28: 220 Ω (red-red-brown).

( ) Solder the leads to the foil and cut off the excess lead lengths.

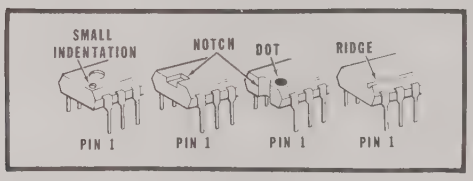
( ) R30: .75 Ω, 2-watt (violet-green-silver).

( ) R21: 222 kΩ, 1%, precision.

( ) R20: 222 kΩ, 1%, precision.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 3

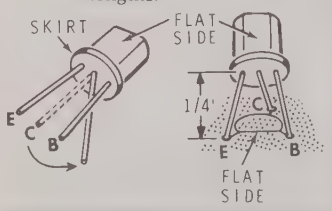


Detail 4A

START

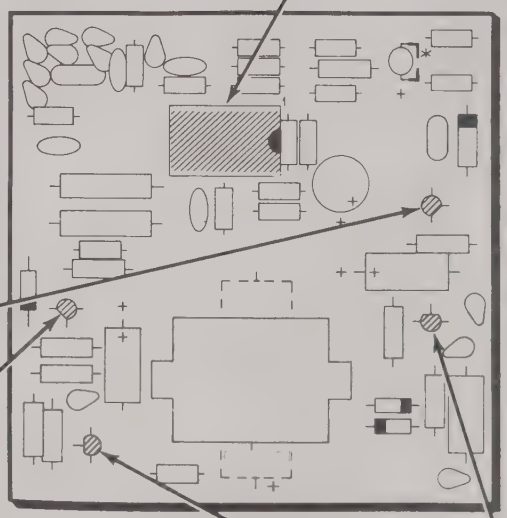
NOTE: In the following steps, install each of the transistors as follows:

1. Refer to the illustration below, identify the E, C, and B leads of the transistor, then bend the C lead as shown.
2. Insert the leads into the corresponding E, C, and B holes in the circuit board.
3. Position the transistor 1/4" above the circuit board.
4. Turn the circuit board over, solder the leads to the foils, and cut off the excess lead lengths.



( ) Q1: 2N3416 transistor (#417-94).

( ) Q2: 2N3416 transistor (#417-94).

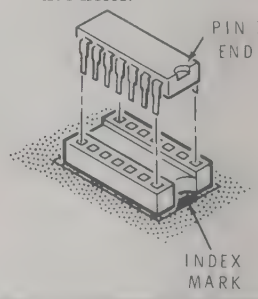


PICTORIAL 4

CONTINUE

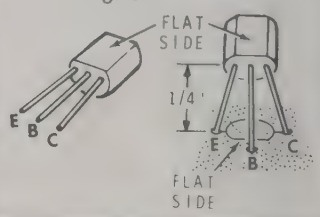
( ) IC1: Install the LM 3900 integrated circuit (#442-71) as follows:

1. Refer to Detail 4A and identify the pin 1 end.
2. Position the pin 1 end of the integrated circuit toward the index mark on the circuit board.
3. Carefully install the integrated circuit. Make sure all the pins are in their respective holes.



In the following steps, install each transistor as follows:

1. Refer to the illustration below and identify the E, B, and C leads.
2. Insert the leads into the corresponding E, B, C holes in the circuit board.
3. Position the transistor 1/4" above the circuit board.
4. Turn the circuit board over, solder the leads to the foil, and cut off the excess lead lengths.

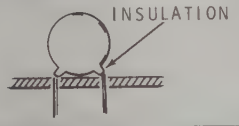


( ) Q3: MPS-A05 transistor (#417-864).

( ) Q4: MPS-A05 transistor (#417-864).

START

NOTE: When you install ceramic capacitors, do not push the insulated portion of the leads into the circuit board holes. This could make it difficult to solder the leads to the foil. Also the leads of the Mylar capacitors may be coated with a clear film. If any soldering problem is encountered with these capacitors, apply more heat to the leads to melt this film.



( ) C3: 420 pF ceramic.

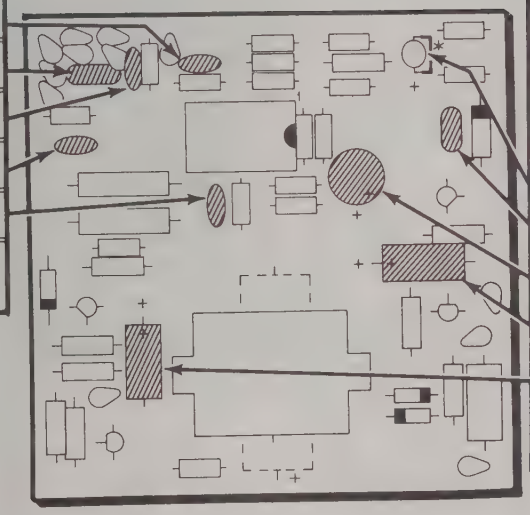
( ) C1: .02 μF Mylar.

( ) C4: .05 μF ceramic.

( ) C7: .05 μF ceramic.

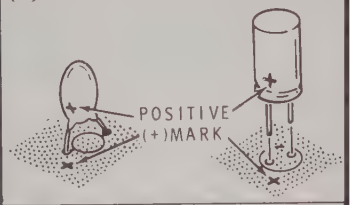
( ) C8: .05 μF ceramic.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

NOTE: When you install a tantalum or electrolytic capacitor, always match the positive (+) or dot marked lead of the capacitor with the positive (+) mark on the circuit board.



NOTE: The two holes at this location will be used later.

( ) C5: .02 μF Mylar.

( ) C2: 100 μF electrolytic.

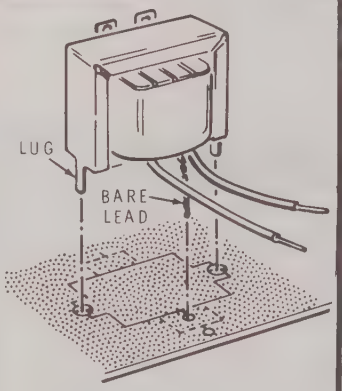
( ) C9: 1.5 μF electrolytic.

( ) C10: 1.5 μF electrolytic.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 5

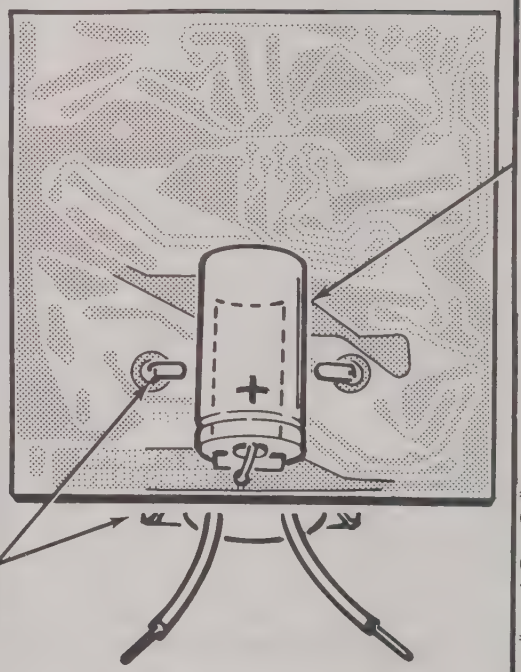
START



( ) T1: Transformer (#51-192).

1. Be sure the bare lead is in the correct hole and mount the transformer on the component side of the circuit board as shown above.
2. Cut the bare lead to 1/4" and bend it flat on the foil.
3. Bend the transformer lugs inward.
4. Solder the lead and lugs to the foil.

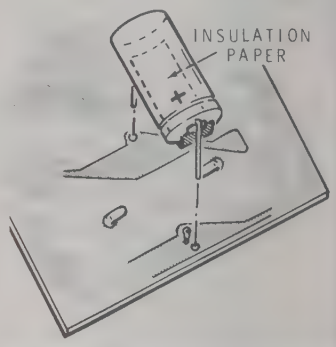
NOTE: The transformer wires will be connected later.



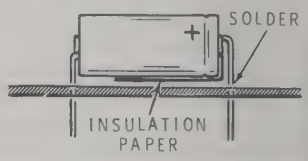
PICTORIAL 6

CONTINUE

( ) Cut the insulation paper to 3/8" × 1-1/2". Remove the backing paper and press the insulating paper on the 2000 μF electrolytic capacitor. Bend it over the positive (+) end as shown.



( ) C11: 2000 μF electrolytic. Position the positive (+) end as shown and mount this capacitor on the foil side of the circuit board. Solder the leads to the foil and cut off the excess lead lengths.



CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) Poor solder connections.

( ) Solder bridges between foils.

( ) Protruding leads which could touch together.

( ) Transistors and diodes for proper installation.

( ) Tantalum and electrolytic capacitors for the correct position of the positive (+) end.

WIRING

The yelp or signaling circuit in this unit can also be wired for continuous tone. Refer to the Operation section to decide whether you want the yelp or continuous tone. Instructions for both follow; use only the steps that pertain to your choice.

Refer to Pictorial 7 for the following steps.

YELP CIRCUIT

( ) C6: 10 μF tantalum capacitor. Refer to the inset drawing and install the capacitor as shown. Be sure you match the positive (+ or dot) marked lead to the positive (+) mark on the circuit board. Do not confuse the + with the *.

( ) Solder the leads to the foil and cut off the excess lead lengths.

NOTE: To prepare a wire in the following steps, cut the wire to the indicated length and remove 1/4" of insulation from each end. Then apply a small amount of solder to the bare wire ends to hold the small strands together.

CONTINUOUS TONE OPTION

( ) Prepare a 1" blue wire.

( ) Connect this wire between the two holes at J*.

( ) Solder both ends to the foil and cut off the excess lead lengths.

Prepare the following wires:

( ) 5-1/2" green

( ) 3" green

( ) 3" orange

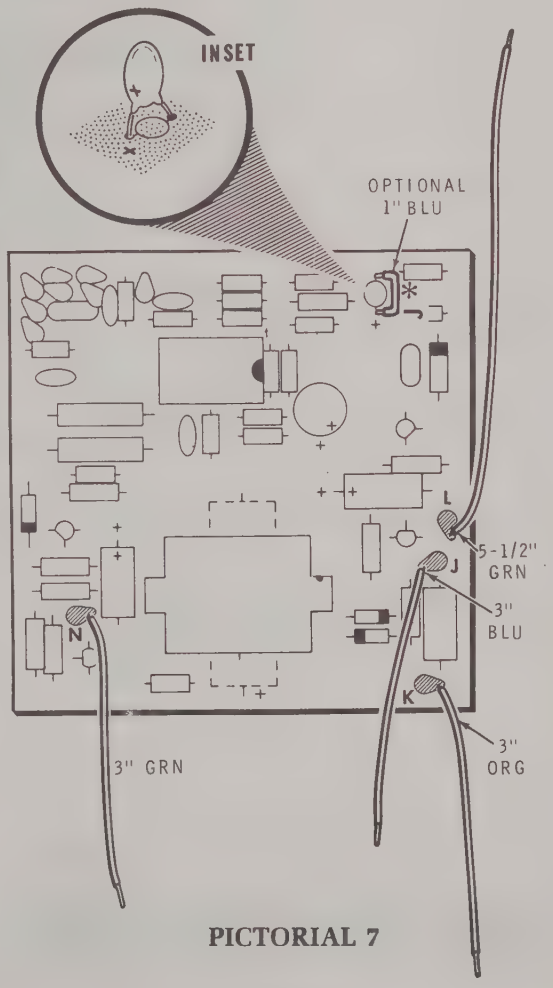
( ) 3" blue

NOTE: In the following steps, (NS) means not to solder because other wires will be added later. "S-" with a number, such as (S-3), means to solder the connection. The number following the "S" tells how many wires are at the connection.

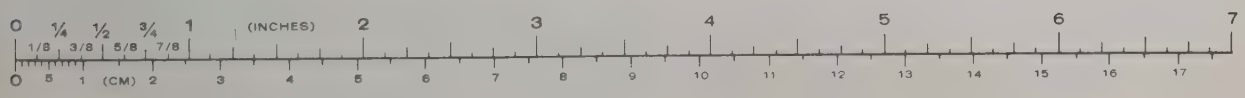
Connect one end of the following wires to the circuit board as follows:

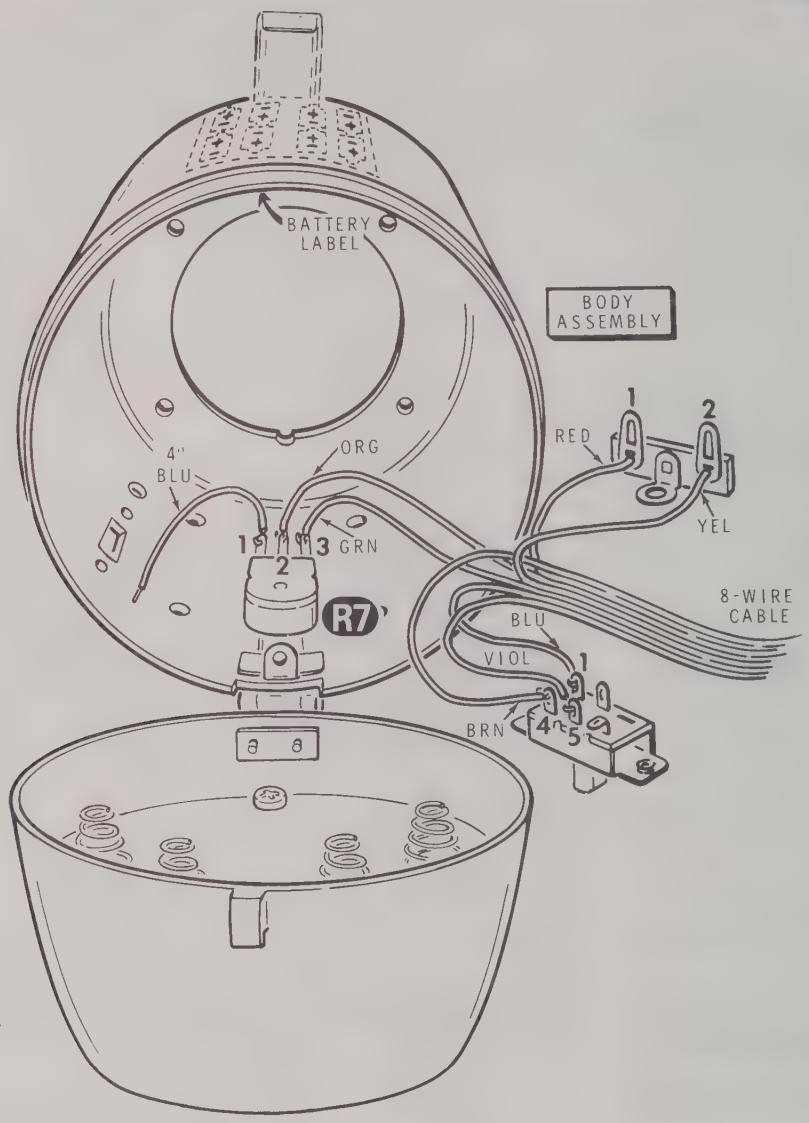
WIRE	HOLE
( ) 5-1/2" green	L (S-1).
( ) 3" green	N (S-1).
( ) 3" orange	K (S-1).
( ) 3" blue	J (S-1).

( ) Cut off the excess lead lengths from all of the solder connections.

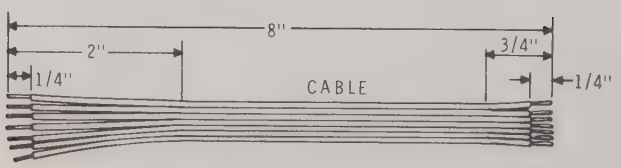


PICTORIAL 7





PICTORIAL 8



Detail 8A

Refer to Pictorial 8 for the following steps:

NOTE: In the following steps, carefully separate the individual wires with a sharp knife or small diagonal cutters.

( ) Cut an 8" length of 8-wire cable. Then remove and discard the gray wire.

( ) Refer to Detail 8A and prepare the cable as shown.

NOTE: The switch you receive may be slightly different than the one shown. If you received a switch with six lugs, the switch can be positioned either way before you wire it.

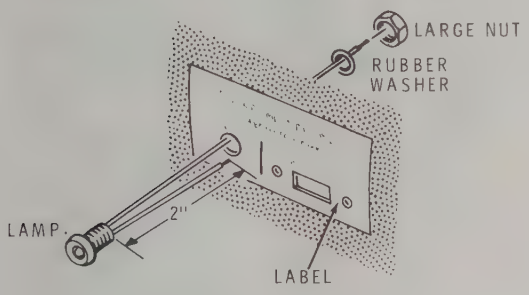
( ) SW1: Position switch SW1 as shown and connect the following wires at the 2" end of the cable:

WIRE	LUG
Blue	1 (S-1)
Brown	4 (NS)
Violet	5 (S-1)

( ) Position the terminal strip as shown and connect the following wires to the eyelets of the terminal strip. Fill the eyelets with solder and cut off the excess wire lengths.

Red wire to lug 1 eyelet (S-1).

Yellow wire to lug 2 eyelet (S-1).



Detail 9A

( ) Locate the body assembly and remove the plastic chassis and battery sleeves. Then, carefully remove the paper backing from the battery label and press the label into place inside the body assembly as shown. If a battery label is already installed, discard this extra label.

( ) Prepare a 4" blue wire.

NOTE: In the following steps, be careful you do not touch the soldering iron to any plastic parts.

( ) R7: Connect one end of the 4" blue wire to control R7 lug 1 (S-1).

( ) Connect the orange wire of the cable to control R7 lug 2 (S-1).

( ) Connect the green wire of the cable to control R7 lug 3 (S-1).

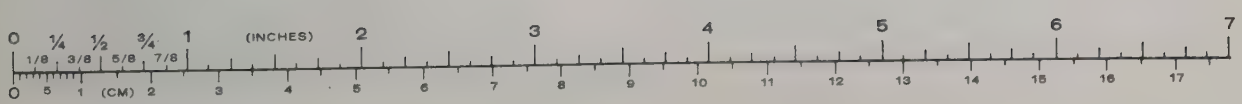
Refer to Pictorial 9 for the following steps and refer to Detail 9A for the next three steps.

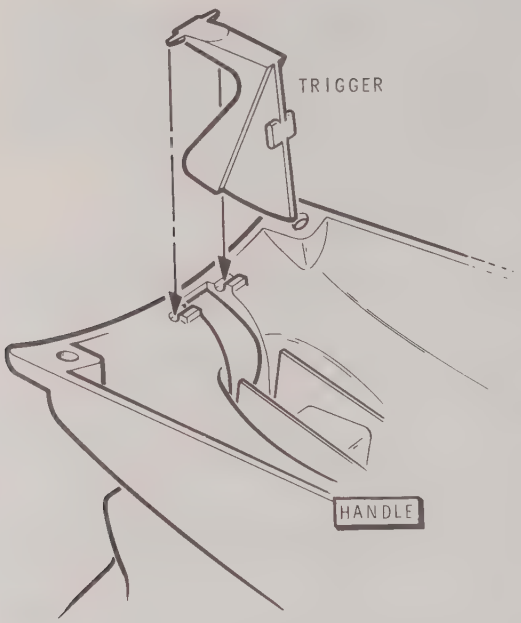
( ) Remove the backing paper from the switch label, align the label with the matching holes and slot, and press it into place on the body assembly.

( ) Cut one lamp lead to 2" and prepare the ends of both lamp leads.

NOTE: Use your fingers to tighten the nut in the next step. Tighten the nut firmly.

( ) Install the lamp in the body assembly with the rubber washer and large nut.





Detail 9B

( ) Refer to Detail 9B and insert the trigger into the handle.

NOTE: In the following steps, do not overtighten the mounting hardware. Start one screw at a time, A and B, then C and D. Tighten the four screws.

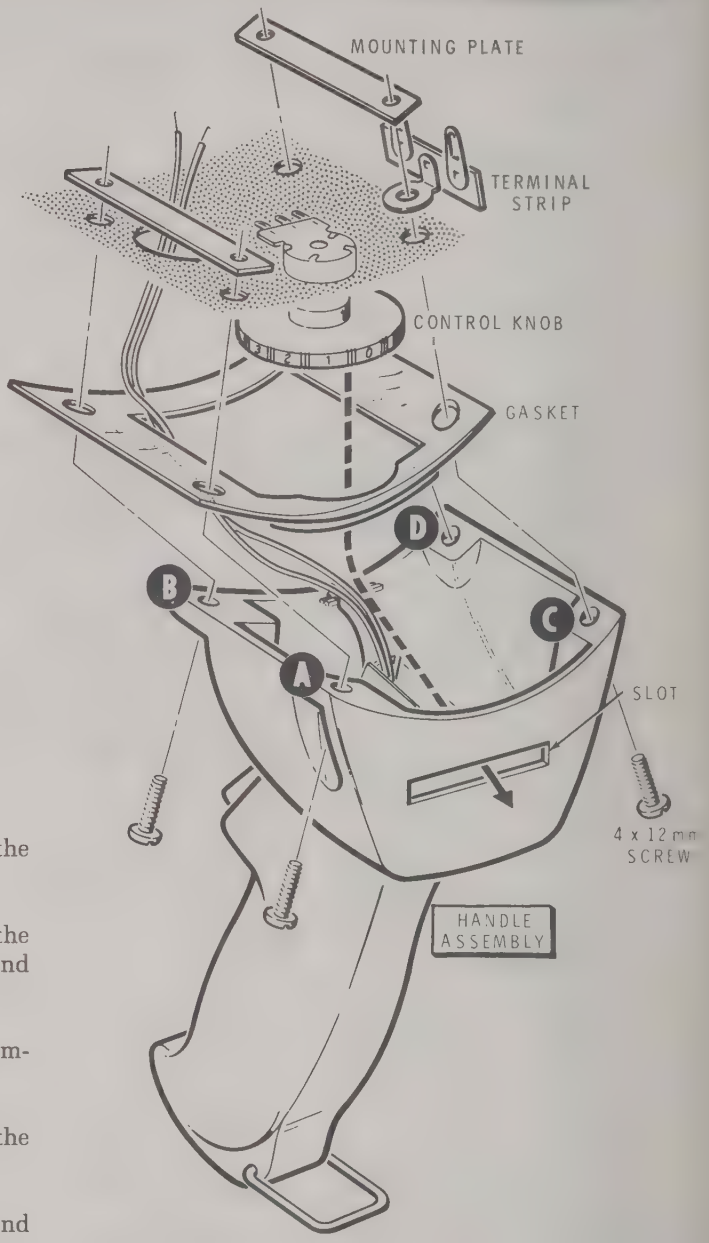
( ) Refer to Detail 9C and mount the handle assembly to the body assembly as follows.

1. Position the gasket on the handle so the holes are aligned.

2. Position the wires through the gasket and the large hole in the body assembly.

3. Guide the control knob through the slot and secure the assemblies with two 4 × 12 mm screws and a mounting plate at holes A and B. Be sure the trigger stays in place and there are no wires under the mounting plate.

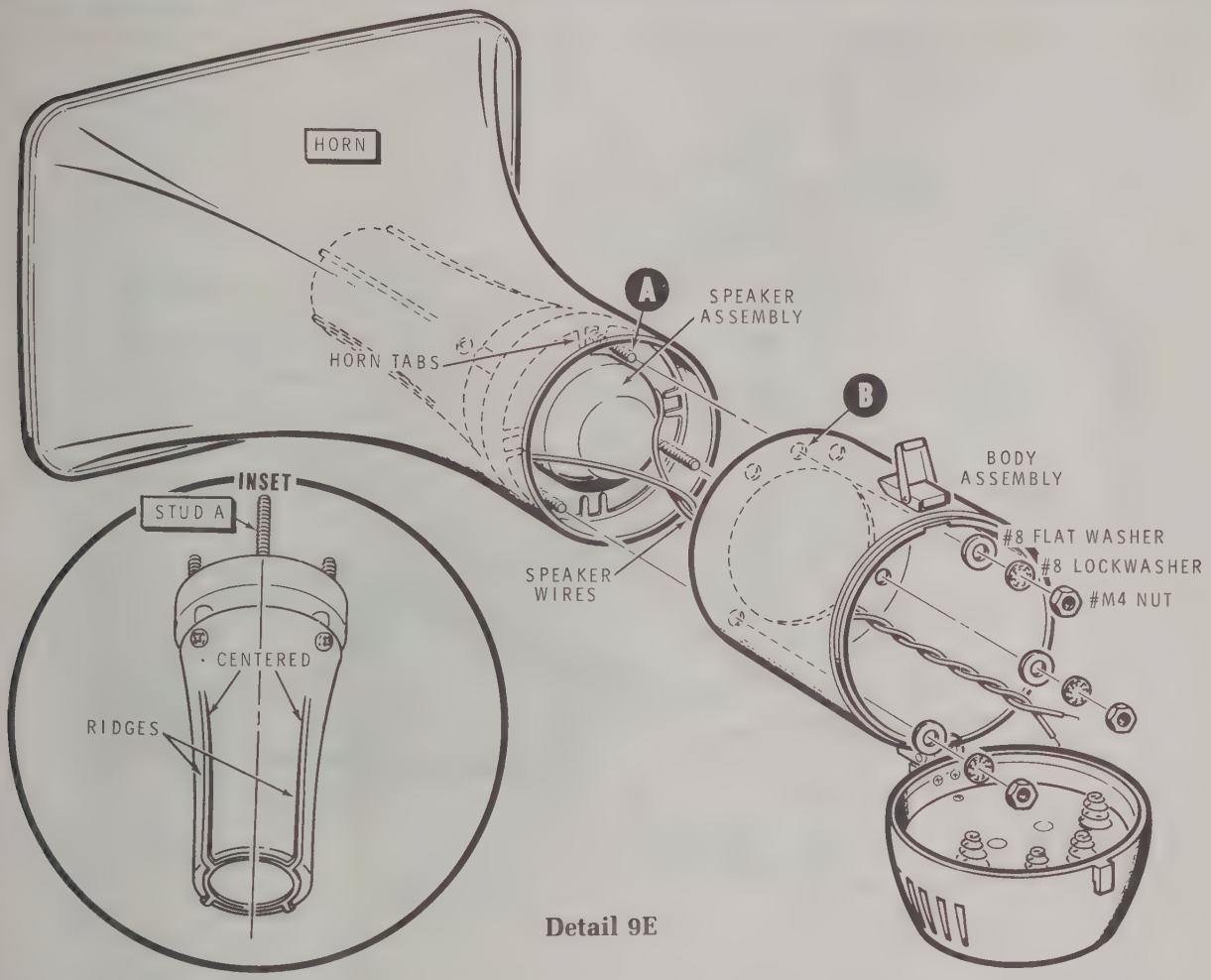
4. In a similar manner, install the other mounting plate and a terminal strip at hole C. Position the terminal strip as shown and parallel to the mounting plate.



Detail 9 C

( ) Set the control knob at 7.

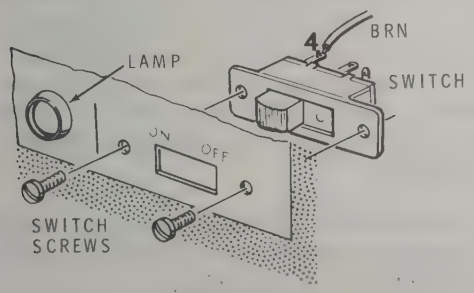
( ) Locate the Volume label and carefully peel it from the backing paper. Center the label cutout over the control knob and press it onto the handle assembly, as shown in Pictorial 9.



Detail 9E

( ) SW1: Refer to Detail 9D, position lug 4 (brown wire) of switch SW1 toward the lamp, and mount the switch to the body assembly. Use two switch screws.

( ) Locate the speaker assembly and prepare the wire ends. Then twist the wires together.



Detail 9D

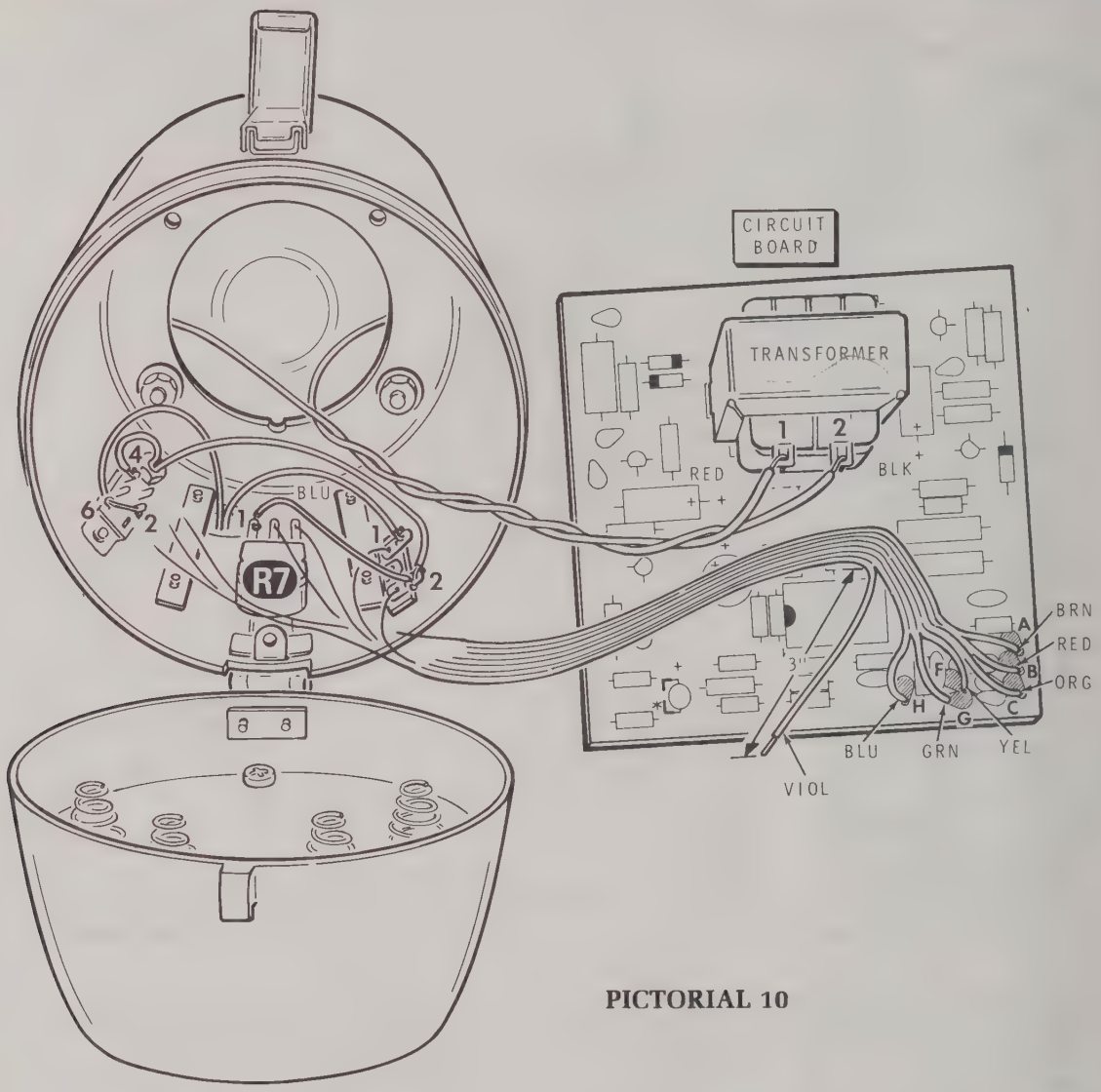
( ) Refer to Detail 9E and the inset drawing and mount the speaker assembly, with the horn, to the body assembly as follows:

1. Insert the speaker wires through the horn and body assembly as shown.

2. Locate stud A. NOTE: Stud A is not in line with the ridges.

3. Position stud A through the horn tabs and hole B in the body.

4. Secure the assemblies with a #8 flat washer, a #8 lockwasher and an M4 nut on each stud. Use the nut starter to hold and start the nuts on the screws. NOTE: Do not twist the nuts more than two turns past finger tight, to avoid breaking the plastic.



PICTORIAL 10

Refer to Pictorial 10 for the following steps.

( ) Connect the blue wire from the control to terminal strip lug 2 (NS).

( ) Connect the long lamp lead to terminal strip lug 2 (S-2).

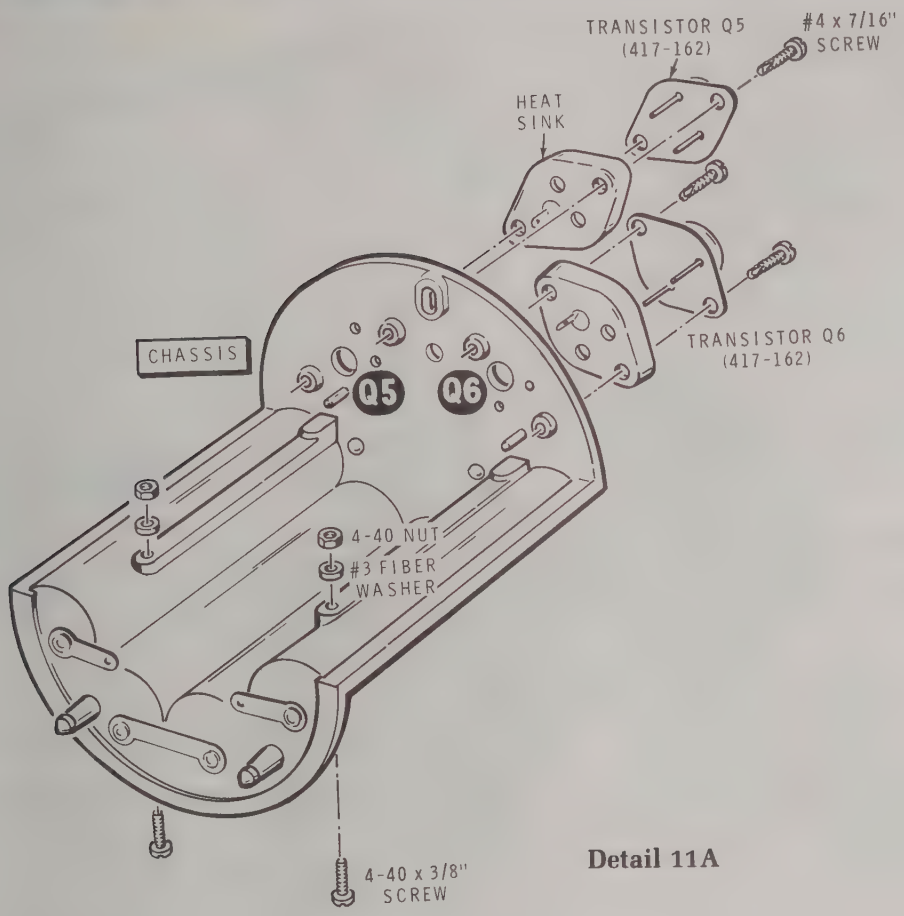
( ) Connect the short lamp lead to switch SW1 lug 4 (S-2).

( ) Connect either black wire from the handle assembly to terminal strip lug 1 (S-1). Prepare these wire ends, if necessary.

( ) Bend the terminal strip 45° as shown.

NOTE: Where a wire passes through a connection and then goes to another point, as in the next step, it will count as two wires in the solder instructions (S-2), one entering and one leaving the connection. Be especially careful, when you solder these connections, to apply enough solder and heat to solder these "through wires."

( ) Remove 3/4" of insulation from the other black wire and connect it through switch SW1 lug 6 (S-2) to switch lug 2 (S-1).



Detail 11A

Connect the free end of the cable to the circuit board holes as follows:

( )	Brown	A (S-1)
( )	Red	B (S-1)
( )	Orange	C (S-1)
( )	Yellow	F (S-1)
( )	Green	G (S-1)
( )	Blue	H (S-1)

( ) Separate the violet wire 3″ from the cable, it will be connected later.

( ) Bend the transformer lugs 90° as shown. Do this carefully with pliers so you do not strain the internal connections.

( ) Connect the red wire from the speaker assembly to transformer lug 1 (S-1).

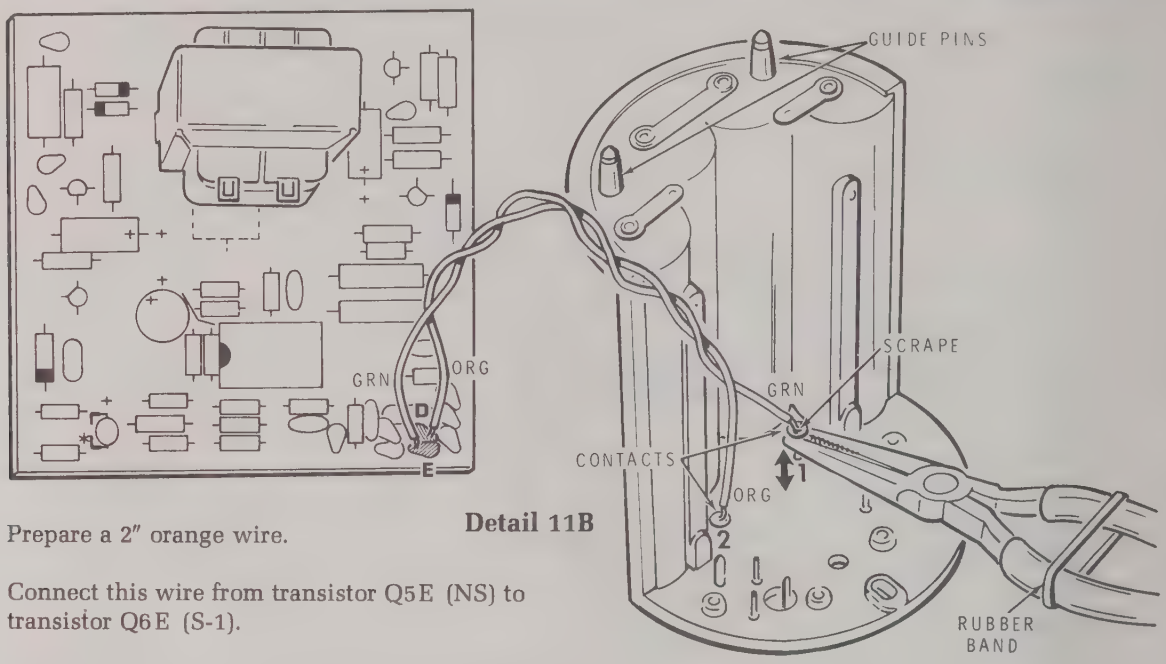
( ) Connect the black wire from the speaker to transformer lug 2 (S-1).

Refer to Pictorial 11 for the following steps, and to Detail 11A for the next three steps.

( ) Mount two 4-40 × 3/8″ screws firmly to the chassis with a #3 fiber washer and a 4-40 nut as shown. Use the nut starter to hold and start the nuts on the screws; then tighten the nuts.

( ) Q5: Mount an MMT 9210 transistor (#417-162) and heat sink at Q5 with two #4 × 7/16″ self-tapping screws. Do not overtighten the screws.

( ) Q6: In the same manner, mount an MMT 9210 transistor (#417-162) at Q6.



Detail 11B

( ) Prepare a 2" orange wire.

( ) Connect this wire from transistor Q5E (NS) to transistor Q6E (S-1).

( ) Prepare a 6-1/2" green wire and a 6-1/2" orange wire; then twist these two wires together.

NOTE: In the next step you will be directed to solder one end of the 6-1/2" green and orange pair of wires to the contacts on the chassis. Refer to Detail 11B and solder each of these wires to the proper contact in the following manner:

1. Scrape or sand the cupped end.
2. Depress the contacts and clamp or hold them. Use pliers as shown.
3. Fill the contact cup with solder; then insert the wire end. Be careful you do not melt the plastic.
4. Release the contacts and be sure they move freely.

( ) Connect the green wire to contact 1 (S-1).

( ) Connect the orange wire to contact 2 (S-1).

Connect the free ends of this pair to the circuit board holes as follows:

( ) Orange to hole D (S-1).

( ) Green to hole E (S-1).

( ) Cut off the excess wire lengths from the foil.

Connect circuit board wires to the transistors in the next five steps as follows:

( ) Orange wire to Q5E (S-2).

( ) Blue transformer lead to Q5C (S-1).

( ) Blue wire to Q5B (S-1).

( ) Red transformer lead to Q6C (S-1).

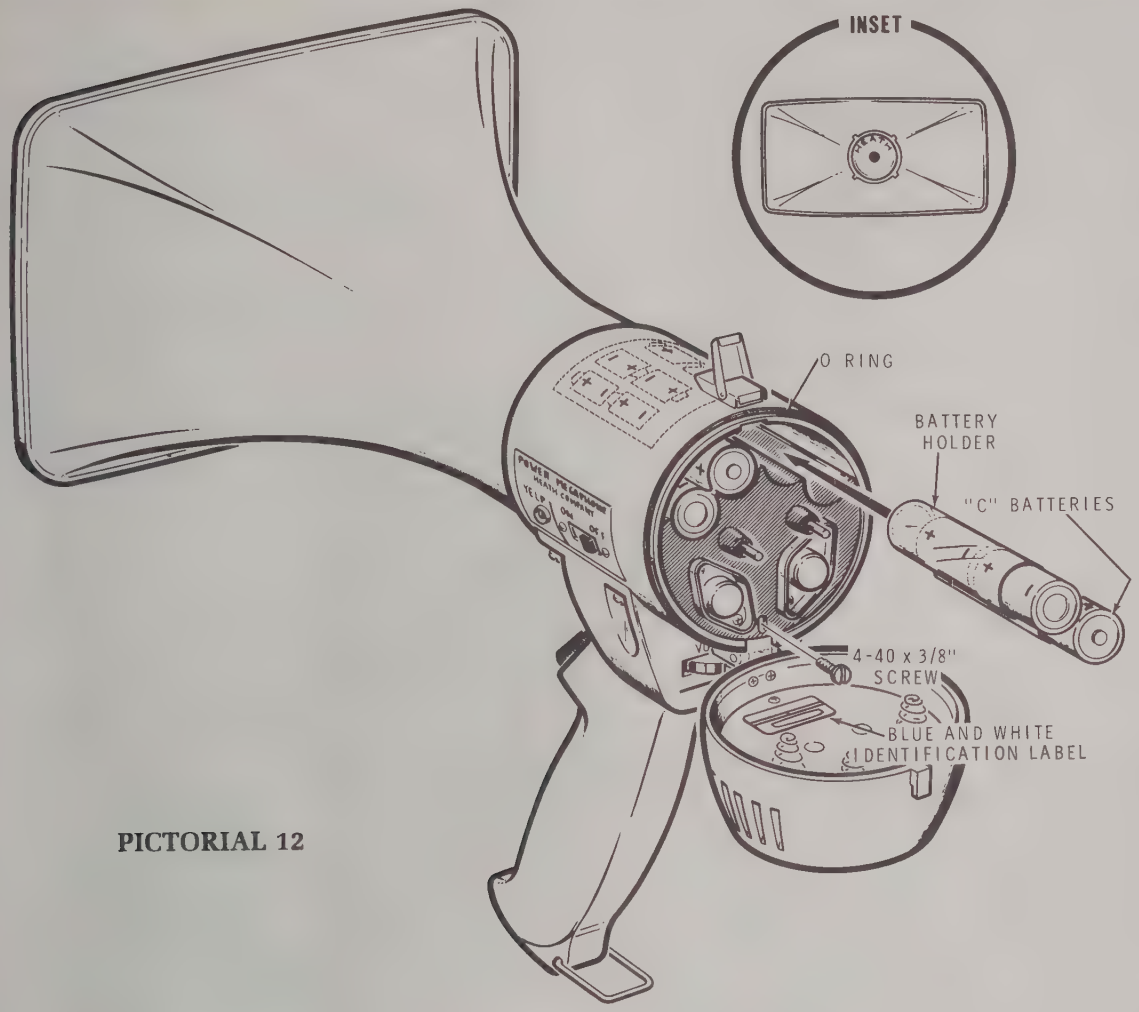
( ) Green wire to Q6B (S-1).

( ) Connect the violet wire from the cable to battery lug 3 (S-1).

( ) Route the green wire under the circuit board and connect it to battery lug 4 (S-1).

NOTE: In the following step, place the circuit board in position, press in the contacts, and be sure the large capacitor does not interfere. Bend the capacitor if necessary.

( ) Mount the circuit board to the chassis with two 4-40 nuts and two #4 lockwashers. Be sure the circuit board edge is under the chassis tabs.



PICTORIAL 12

Refer to Pictorial 12 for the following steps:

( ) Check the wire connections and position the wires against the body assembly.

( ) Align the two guide pins on the end of the chassis assembly (see Detail 11B) with the holes inside the body assembly. Then slide the chassis into the body. Secure the chassis with a 4-40 × 3/8" screw.

( ) Place the O ring in the groove in the body.

( ) Press the YELP switch to the Off position.

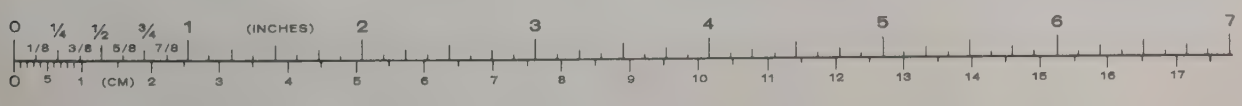
( ) Refer to the battery label and place eight "C" batteries in the battery sleeves. Then place the sleeves into the body assembly.

( ) Carefully peel away the backing paper from the blue and white identification label. Then press the label into place as shown. Be sure to refer to the numbers on this label in any communications you have with the Heath Company about this kit.

( ) Close the cover and latch it in place.

( ) Carefully peel away the backing paper from the round Heath label and press the label into place on the speaker. Refer to the inset drawing. The brushed aluminum surface may help you align the label horizontally.

This completes the assembly of the Power Megaphone. Proceed to the "Initial Tests" section.



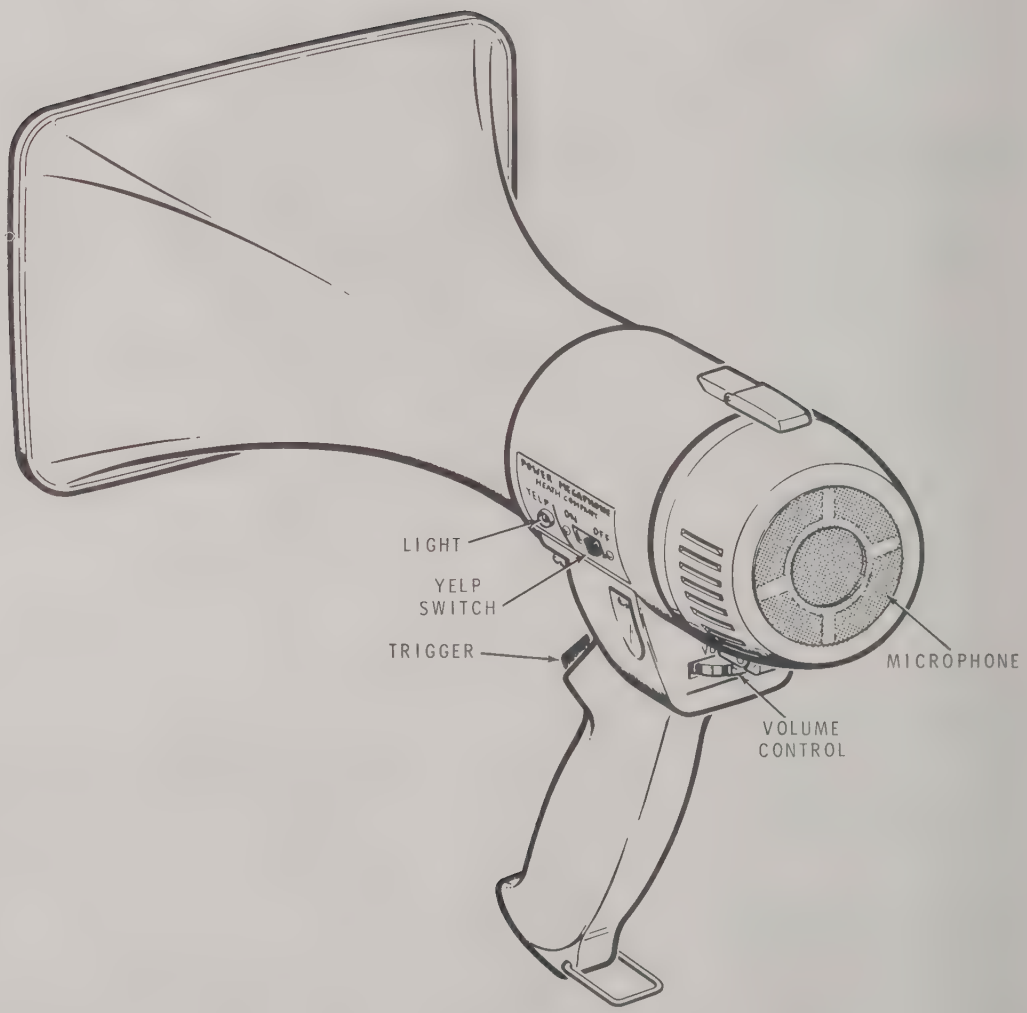


Figure 1

INITIAL TESTS

Refer to Figure 1 to identify the switches and control in the following steps.

NOTE: If you do not obtain the proper results in any of the following steps, proceed to the "In Case of Difficulty" section on Page 26.

( ) Place the Yelp switch in the OFF position and turn the VOLUME control to 0.

NOTE: In the following steps loud feedback (squeal) with the control set at 7 or above indicates excess amplification. This occurs with fresh batteries; then as the battery voltage goes down, the control can be adjusted to maintain peak amplification.

( ) Pull the Trigger, talk into the microphone and slowly turn the VOLUME control up. Release the Trigger.

( ) Place the Yelp switch to the ON position and set VOLUME control at 0.

( ) Pull Trigger. You should hear faint yelp (or continuous tone). Release the Trigger.

( ) Place the Yelp switch to the OFF position.

OPERATION

Refer to Figure 1 for the following explanation.

1. Set the Volume control for the sound level you desire.
2. Place the Yelp switch to the ON position; this turns on both the light and the Yelp circuit.
3. Pull and release the Trigger as necessary to gain attention.
4. Place the Yelp switch to the OFF position.
5. Pull the Trigger and talk.
6. Place the Yelp switch to the OFF position when the unit is not in use.

GENERAL

A Trigger switch turns this Megaphone on. A Yelp switch turns on the Yelp (or continuous tone) circuit and a bright light to remind you that the Yelp is on. The Volume control sets the sound level for either Yelp switch position, but it does not have the same effect in both positions. With the Yelp ON, the volume increases very rapidly so that full yelp power is available for a reasonable volume setting in voice mode.

The yelp or signaling circuit gives one decending yelp burst each time you pull the Trigger. If you wired your unit for the optional continuous tone, the yelp becomes a steady tone as long as the Trigger is depressed. In this case, you can control the tone as you would a horn. Either circuit puts a heavy drain on the batteries, so use them sparingly.

The voice or amplifier mode (Yelp switch off, Trigger depressed) allows amplification for the microphone input depending upon the volume control setting. For normal use, set the Volume control about two numbers below the position where feedback (squeal) occurs. Depress the Trigger and speak directly into the microphone with your mouth nearly touching it. Use an evenly modulated, and if necessary, loud voice. Release the Trigger when you are not talking, to conserve your batteries.

WARNING: The high sound levels may cause ear damage at close range.

BATTERIES

Standard (carbon-zinc) or "extra duty" flashlight "C" cells are fine for occasional use. For heavy-duty use, there is a cost advantage if you buy heavy-duty alkaline "C" cells. In either case, remove the batteries, to prevent leakage, when you store the unit for long periods of time. Also, consider replacing batteries at least yearly to avoid damage and assure good operation.

As the batteries become weak, the Volume control will have to be adjusted higher. Therefore, the setting of the Volume control may be a rough indication of the general battery condition. The cells can be individually checked with a voltmeter. The cells should give a 1.4-volt or higher reading.

IN CASE OF DIFFICULTY

This part of the Manual will help you locate and correct any difficulty that may occur in your Power Megaphone. This information is divided into three sections. The first section, "General", is a list of visual checks and precautions. Follow the visual checks very carefully since many difficulties can be corrected right here. The second section consists of a "Troubleshooting Chart" that lists specific difficulties that could occur in your unit, and one or more possible causes. The visual checks can also be helpful in this section for locating a difficulty. The third section has hum injection tests that go into more detail. An external 12-volt power source is required to make the hum tests.

General

1. About 90% of the kits that are returned for repair do not function properly due to poor connections and soldering. Therefore, many troubles can be eliminated by a careful inspection of the connections to make sure they are soldered as described in Pictorial 1. Reheat any doubtful connections.

2. Check to be sure that the integrated circuit and all transistors are in their proper locations, and are installed correctly.

3. Be sure the correct diode is installed at the correct location, and that the banded end is positioned correctly.

4. Check the value of each part. Be sure the proper part has been wired into the circuit, as shown in the Pictorials and as called out in the wiring instructions. It would be easy, for example, to install a 220 kΩ (red-red-yellow) resistor in a step that calls for a 220 Ω (red-red-brown) resistor.

5. Check electrolytic capacitors for the correct position of the positive end.

6. Check all of the component leads connected to the circuit board. Make sure the leads do not extend through the circuit board and make contact with other connections or parts. Also make sure there are no solder bridges between adjacent connections.

If you still cannot locate and correct the trouble after the above checks are completed, and if a voltmeter is available check the megaphone's voltages against the voltages on the schematic diagram.

NOTE: In an extreme case where you are unable to resolve a difficulty, refer to the "Customer Service" information inside the rear cover of the Manual. Your Warranty is located inside the front cover.

Troubleshooting Chart

The following chart lists specific difficulties or conditions that could occur in your Power Megaphone. Several possible causes may be listed for each difficulty. Refer to the "Circuit Board X-Ray Views" and the Schematic diagram to locate and identify the parts listed in these pages.

CONDITION	POSSIBLE CAUSE
Unit does not function—lamp does not light in Yelp mode.	1. Batteries or power supply installed or connected improperly. 2. Wiring error — check 8-wire cable and switch wiring.
No Yelp output — voice OK.	1. D2. 2. Switch wiring incorrect. 3. IC1B and associated components. 4. R2.
No voice output — Yelp OK.	1. Microphone spring connector wires. 2. Connection between spring connector and microphone terminals. 3. Microphone.
No Yelp or voice output — lamp lights in yelp mode.	1. IC1. 2. Speaker connections. 3. Speaker.
Distorted sound in voice mode.	1. Q1, Q3, Q5 and associated components. 2. Q2, Q4, Q6 and associated components. 3. IC1.
Lamp does not light in Yelp mode.	1. PL1. 2. PL1 incorrectly wired.
Yelp will not shut off. (Does not apply to optional continuous tone.)	1. C6 leaking or installed backward.

Hum Injection Tests

You will need a 12-volt power supply for the following steps. You can use two common 6-volt lantern batteries. Connect the positive and negative leads as indicated in Pictorial 11.

( ) Remove the 4-40 × 3/8″ screw and the plastic chassis from the body assembly.

( ) Carefully remove IC1 from its socket.

NOTE: If you have an ohmmeter available, you can quickly check the speaker and microphone for continuity. The ohmmeter battery will supply enough power to produce a faint click sound.

( ) Place the ohmmeter in low or X1 range.

( ) Set switch SW1 to the ON position.

( ) Touch the transistor (Q5 and Q6) heat sinks and listen for a faint click from the speaker. There should be very low resistance indication.

( ) Measure the resistance across the microphone contacts. The resistance should be about 25 Ω and you should hear a faint click from the microphone.

When you touch the test point, use a small screwdriver or other metal probe. Touch the test point and hold your finger on the metal part of the probe. You should hear a buzz. If you do not, check the items in the Possible Cause column and related components.

TEST POINT	POSSIBLE CAUSE
Q1, base.	1. Q1, Q3, Q5. 2. Check wires to Q5.
Q2, base.	1. Q2, Q4, Q6 2. Check wires to Q6.
INSTALL THE INTEGRATED CIRCUIT	
IC1, pin 8.	1. IC1, pins 7, 8, 9, 13, and associated parts. 2. R18, R21.
TURN UP THE VOLUME CONTROL	
R14. Lead nearest outside circuit board edge.	1. IC1, pins 10, 11, 12. 2. R14, R16, R19.
SWITCH SW1 TO OFF (VOICE MODE)	
R1. Lead nearest hole H. Pull trigger and slowly advance VOLUME control.	1. IC1, pins 1, 5, 6, and 14. 2. C1, C3, C4. 3. R1, R3, R4.

SPECIFICATIONS

Power Output	20-watts peak voice power.
Yelp Alarm	Single downward wail with automatic shutoff. Continuous tone optional.
Pilot Lamp	Indicates yelp or continuous tone.
Power Source	12 volts (Eight "C" cells) as low as 6 volts.
Microphone	Built-in, noise cancelling.
Volume Control	Built-in.
Water Resistance	Spray, but not immersible.
Weight	4 lbs. 12 oz. (2.15 kg) with batteries.
Dimensions	Horn end — 8-3/4" wide × 6-1/4" high 14-1/2" long overall. (22.22 cm wide × 15.87 cm high × 36.83 cm long.)

The Heath Company reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.

CIRCUIT DESCRIPTION

The Power Megaphone consists of a microphone, amplifier, oscillator and speaker. Audio signals from the microphone are amplified by IC1A, which is one section of the quad amplifier IC1. The signal then couples to volume control R7 which is set for the degree of amplification. From R7 the signal goes to IC1C for more amplification. IC1D is a unity gain inverter that is driven by the output of IC1C. The outputs of IC1C and IC1D drive identical transistor amplifiers Q1, Q3, and Q5 and Q2, Q4, and Q6 respectively. The IC outputs are equal in amplitude, but opposite in phase. Each transistor amplifier thus alternately handles positive and negative half cycles. Diodes D3 and D4 provide DC bias for Q3, Q4 and output transistors Q5 and Q6 which drive transformer T1. The transformer then drives the speaker.

When switch SW1 is in the ON (yelp) position, the output of IC1A is biased at zero volts by R2 so that it is no longer sensitive to the microphone input. IC1B is used as a voltage controlled oscillator with its control voltage switched by trigger switch, SW2. Diode D1 regulates the control voltage and capacitor C6 shapes this voltage to give the desired sound. If C6 is replaced by a jumper, a continuous tone is generated when the trigger is pulled. The oscillator output of IC1B couples into IC1A and is large enough to overcome the bias from R2. The yelp signal is much larger than the voice signal at the output of IC1A, so that most volume settings for voice give full yelp power.

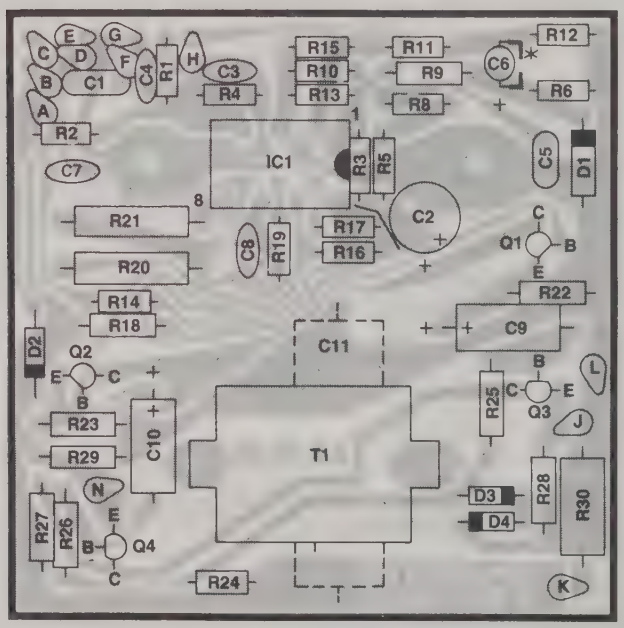
CIRCUIT BOARD X-RAY VIEW

NOTE: To find the PART NUMBER of a component for the purpose of ordering a replacement part:

A. Find the circuit component number (R5, C3, etc.) on the X-Ray View.

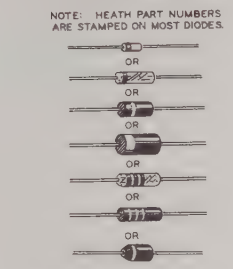
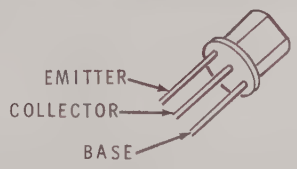
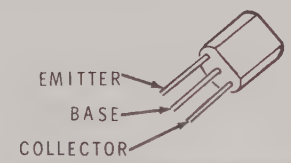
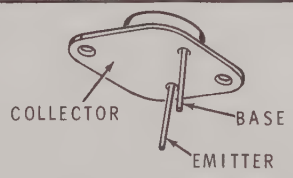
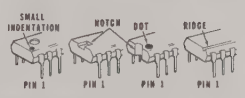
B. Locate this same number in the "Circuit Component Number" column of the "Parts List" in the front of this Manual.

C. Adjacent to the circuit component number, you will find the PART NUMBER and DESCRIPTION which must be supplied when you order a replacement part.



VIEWED FROM COMPONENT SIDE

SEMICONDUCTOR IDENTIFICATION CHART

SCHEMATIC NUMBER	HEATH PART NUMBER	MANUFACTURER'S NUMBER	LEAD IDENTIFICATION
D3, D4	56-84	1N4148	
D1	56-58	1N709A (6.2V)	
D2	57-65	1N4002	
Q1, Q2	417-94	2N3416	
Q3, Q4	417-864	MPSA05	
Q5, Q6	417-162	MHT9210	
IC1	442-71	LM3900	

FOR PARTS REQUESTS ONLY

- Be sure to follow instructions carefully.
- Use a separate letter for all correspondence.
- Please allow 10 - 14 days for mail delivery time.

DO NOT WRITE IN THIS SPACE

INSTRUCTIONS

- Please print all information requested.
- Be sure you list the correct **HEATH** part number exactly as it appears in the parts list.
- If you wish to prepay your order, mail this card and your payment in an envelope. Be sure to include 10% (25¢ minimum, $3.50 maximum) for insurance, shipping and handling. Michigan residents add 4% tax.

  Total enclosed $_____
- If you prefer COD shipment, check the COD box and mail this form. COD ☐

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

The information requested in the next two lines is not required when purchasing nonwarranty replacement parts, but it can help us provide you with better products in the future.

Model # _____ Invoice # _____

Date Purchased _____ Location Purchased _____

LIST **HEATH** PART NUMBER	QTY.	PRICE EACH	TOTAL PRICE

TOTAL FOR PARTS	
HANDLING AND SHIPPING	
MICHIGAN RESIDENTS ADD 4% TAX	
TOTAL AMOUNT OF ORDER	

SEND TO: **HEATH COMPANY**
BENTON HARBOR
MICHIGAN 49022
ATTN: PARTS REPLACEMENT

Phone (Replacement parts only): 616 982-3571

THIS FORM IS FOR U.S. CUSTOMERS ONLY
OVERSEAS CUSTOMERS SEE YOUR DISTRIBUTOR

CUT ALONG DOTTED LINE

FOR PARTS REQUESTS ONLY

- Be sure to follow instructions carefully.
- Use a separate letter for all correspondence.
- Please allow 10 - 14 days for mail delivery time.

DO NOT WRITE IN THIS SPACE

INSTRUCTIONS

- Please print all information requested.
- Be sure you list the correct **HEATH** part number exactly as it appears in the parts list.
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  Total enclosed $_____
- If you prefer COD shipment, check the COD box and mail this form. COD ☐

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

The information requested in the next two lines is not required when purchasing nonwarranty replacement parts, but it can help us provide you with better products in the future.

Model # _____ Invoice # _____

Date Purchased _____ Location Purchased _____

LIST **HEATH** PART NUMBER	QTY.	PRICE EACH	TOTAL PRICE

TOTAL FOR PARTS	
HANDLING AND SHIPPING	
MICHIGAN RESIDENTS ADD 4% TAX	
TOTAL AMOUNT OF ORDER	

SEND TO: **HEATH COMPANY**
BENTON HARBOR
MICHIGAN 49022
ATTN: PARTS REPLACEMENT

Phone (Replacement parts only): 616 982-3571

THIS FORM IS FOR U.S. CUSTOMERS ONLY
OVERSEAS CUSTOMERS SEE YOUR DISTRIBUTOR

CUSTOMER SERVICE

REPLACEMENT PARTS

Please provide complete information when you request replacements from either the factory or Heath Electronic Centers. Be certain to include the **HEATH** part number exactly as it appears in the parts list.

Replacement parts are maintained specifically to repair Heath products. Parts sales for other reasons will be declined.

ORDERING FROM THE FACTORY

Print all of the information requested on the parts order form furnished with this product and mail it to Heath. For telephone orders (parts only) dial 616 982-3571. If you are unable to locate an order form, write us a letter or card including:

- Heath part number.
- Model number.
- Date of purchase.
- Location purchased or invoice number.
- Nature of the defect.
- Your payment or authorization for COD shipment of parts not covered by warranty.

Mail letters to: Heath Company
Benton Harbor
MI 49022
Attn: Parts Replacement

Retain original parts until you receive replacements. Parts that should be returned to the factory will be listed on your packing slip.

OBTAINING REPLACEMENTS FROM HEATH ELECTRONIC CENTERS

For your convenience, "over the counter" replacement parts are available from the Heath Electronic Centers listed in your catalog. Be sure to bring in the original part and purchase invoice when you request a warranty replacement from a Heath Electronic Center.

TECHNICAL CONSULTATION

Need help with your kit? — Self-Service? — Construction? — Operation? — Call or write for assistance. you'll find our Technical Consultants eager to help with just about any technical problem except "customizing" for unique applications.

The effectiveness of our consultation service depends on the information you furnish. Be sure to tell us:

- The Model number and Series number from the blue and white label.
- The date of purchase.
- An exact description of the difficulty.
- Everything you have done in attempting to correct the problem.

Also include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.

Please do not send parts for testing, unless this is specifically requested by our Consultants.

Hints: Telephone traffic is lightest at midweek — please be sure your Manual and notes are on hand when you call.

Heathkit Electronic Center facilities are also available for telephone or "walk-in" personal assistance.

REPAIR SERVICE

Service facilities are available, if they are needed, to repair your completed kit. (Kits that have been modified, soldered with paste flux or acid core solder, cannot be accepted for repair.)

If it is convenient, personally deliver your kit to a Heathkit Electronic Center. For warranty parts replacement, supply a copy of the invoice or sales slip.

If you prefer to ship your kit to the factory, attach a letter containing the following information directly to the unit:

- Your name and address.
- Date of purchase and invoice number.
- Copies of all correspondence relevant to the service of the kit.
- A brief description of the difficulty.
- Authorization to return your kit COD for the service and shipping charges. (This will reduce the possibility of delay.)

Check the equipment to see that all screws and parts are secured. (Do not include any wooden cabinets or color television picture tubes, as these are easily damaged in shipment. Do not include the kit Manual.) Place the equipment in a strong carton with at least THREE INCHES of *resilient* packing material (shredded paper, excelsior, etc.) on all sides. Use additional packing material where there are protrusions (control sticks, large knobs, etc.). If the unit weighs over 15 lbs., place this carton in another one with 3/4" of packing material between the two.

Seal the carton with reinforced gummed tape, tie it with a strong cord, and mark it "Fragile" on at least two sides. Remember, the carrier will not accept liability for shipping damage if the unit is insufficiently packed. Ship by prepaid express, United Parcel Service, or insured Parcel Post to:

Heath Company
Service Department
Benton Harbor, Michigan 49022

HEATH

Schlumberger

MP MASTER

MA22800

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